

WHAT IS CLAIMED IS:

1. An apparatus for driving a liquid crystal display having a data driver, comprising:

a picture quality improving unit that receives input data for a frame, wherein the picture quality improving unit analyzes green input data to determine a brightness of the frame and performs a gamma compensation on the input data in accordance with the brightness of the frame to generate output data; and

a timing controller that rearranges the output data to supply the rearranged output data to the data driver.

2. The apparatus for driving the liquid crystal display according to claim 1, wherein the picture quality improving unit receives an external input synchronization signal and modifies the received external input synchronization signal to synchronize the output data in the timing controller.

3. The apparatus for driving the liquid crystal display according to claim 1, wherein if the average brightness of the input data for the frame is higher than a predetermined reference value, the picture quality improving unit performs the gamma compensation on the input data.

4. The apparatus for driving the liquid crystal display according to claim 3, wherein the predetermined reference value is experimentally determined.

5. The apparatus for driving the liquid crystal display according to claim 3, wherein the predetermined reference value is calculated.

6. The apparatus for driving the liquid crystal display according to claim 3, wherein a gamma curve with a high slope is used in the gamma compensation of high brightness input data and a gamma curve with a low slope is used in the gamma compensation of low brightness input data.

7. The apparatus for driving the liquid crystal display according to claim 3, further comprising:

a backlight; and

an inverter that controls the brightness of the backlight, wherein if the average of the analyzed brightness of the input data is higher than the predetermined reference value, the picture quality improving unit generates and supplies a control signal to the inverter.

8. The apparatus for driving the liquid crystal display according to claim 7, wherein the inverter, in response to the control signal, generates a driving voltage to increase the brightness of the backlight.

9. The apparatus for driving the liquid crystal display according to claim 7, wherein the inverter, in response to the control signal, generates a driving voltage to decrease the brightness of the backlight.

10. An apparatus for driving a liquid crystal display having a data driver and a gate driver, comprising:

an image signal modulation unit that analyzes input green data from input data for a frame to determine the brightness of the frame and that generates output data, wherein the brightness of the output data has been changed in accordance with the analyzed brightness to increase the contrast of the frame;

a controller that modulates an input synchronization signal associated with the input data to generate a output synchronization signal to synchronize the output data; and

a timing controller that rearranges the output data and that generates a driving control signal to be supplied to the data driver and the gate driver by using the output synchronization signal.

11. The apparatus for driving the liquid crystal display according to claim 10, wherein the image signal modulation unit comprises:

a histogram analyzer that produces a brightness histogram of the input green data of the frame to detect brightness information for the frame and that generates a histogram brightness control signal when an average brightness of the frame indicated by the histogram is higher than a predetermined reference value;

a delaying unit that delays the input data until the histogram analyzer detects the brightness information;

a histogram modulation unit that gamma compensates the delayed input data according to the histogram brightness control signal to generate the output data; and

a lookup table that stores modulation data for gamma curves used in the gamma compensation.

12. The apparatus for driving the liquid crystal display according to claim 11, wherein the predetermined reference value is experimentally determined.

13. The apparatus for driving the liquid crystal display according to claim 11, wherein the histogram modulation unit performs the gamma compensation in order to increase contrast in the frame.

14. The apparatus for driving the liquid crystal display according to claim 11, wherein the histogram modulation unit performs the gamma compensation by using a gamma curve with a high slope for the brightness values corresponding to the largest amount of input data, and wherein the histogram modulation unit performs the gamma compensation by using a gamma curve with a low slope for the brightness values corresponding to the smallest amount of input data.

15. The apparatus of driving the liquid crystal display according to claim 14, wherein a gamma curve with a high slope is used in the gamma compensation of high brightness input data and a gamma curve with a low slope is used in the gamma compensation of low brightness input data.

16. The apparatus for driving the liquid crystal display according to claim 14, wherein if the histogram represents a dark picture, the histogram modulation unit performs the gamma compensation by using the gamma curve with high slope in the picture having a low gray scale and performs the gamma compensation by using the gamma curve with the low slope in the picture having a high gray scale.

17. The apparatus for driving the liquid crystal display according to claim 11, further comprising:

a backlight control unit connected to the histogram analyzer that generates an inverter brightness control signal corresponding to the histogram brightness control signal when the histogram brightness control signal is supplied thereto;

an inverter that supplies to the backlight a drive voltage corresponding to the inverter brightness control signal supplied from the backlight controller; and

a backlight that generates a light brightness level corresponding to the drive voltage supplied from the inverter.

18. The apparatus for driving the liquid crystal display according to claim 17, wherein if the histogram brightness control signal is supplied to the backlight controller, the backlight controller generates the inverter brightness control signal for the inverter so that the light level generated by the backlight is increased.

19. The apparatus for driving the liquid crystal display according to claim 17, wherein when the histogram brightness control signal is supplied to the backlight controller, the backlight controller generates the inverter brightness control signal for the inverter so that the light level generated by the backlight is decreased.

20. The apparatus of driving the liquid crystal display according to claim 17, wherein if the histogram brightness control signal is not supplied to the backlight controller, the backlight controller does not generate the inverter brightness control signal, and if the inverter does not receive the brightness control signal, the inverter supplies a predetermined drive voltage to the backlight.

21. The apparatus for driving the liquid crystal display according to claim 17, further comprising a digital to analog converter installed between the backlight controller and the inverter for converting the inverter brightness control signal supplied from the backlight controller into an analog brightness control signal.

22. A method of driving a liquid crystal display having a data driver, comprising the steps of:

producing a brightness histogram using input green data of input data from a frame that indicates brightness information;

performing a gamma compensation of the input data in order to increase contrast of the frame if an average value of the brightness information is higher than a predetermined reference value; and

rearranging the compensated input data to supply to the data driver.

23. The method of driving according to claim 22, wherein the predetermined reference value is experimentally determined.

24. The method of driving according to claim 22, wherein the step of performing the gamma compensation performs the gamma compensation by using a gamma curve with a high slope for the brightness values corresponding to the largest amount of input data, and wherein the histogram modulation unit performs the gamma compensation by using a gamma curve with a low slope for the brightness values corresponding to the smallest amount of input data.

25. The method of driving according to claim 22, further comprising the step of controlling the brightness of the backlight if the average value of the brightness information is higher than the reference value.

26. The method of driving according to claim 25, wherein the brightness of the backlight is increased if the average value of the brightness information is higher than the reference value.

27. The method of driving according to claim 25, wherein the brightness of the backlight is decreased if the average value of the brightness information is higher than the reference value.

28. The method of driving according to claim 22, further comprising the step of synchronizing input synchronization signals received with the gamma-compensated data.